

UDC 666.11(470):666.171:666.172.6

## PRODUCTION OF GLASS CONTAINERS IN RUSSIA (A MARKETING REVIEW)

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Translated from *Steklo i Keramika*, No. 9, pp. 7 – 9, September, 2002.

The state and prospects for production and marketing of glass containers in Russia are analyzed.

Prior to year 1990, the amount of investments in production of glass containers in Russia was insignificant. The crisis of 1991 – 1994 aggravated the low technical level of glass production (a scanty product range and not totally satisfactory quality of domestic glass containers).

Starting in 1995, the flow of investments, both domestic and foreign (Czech Republic, Germany, Belgium, Turkey) in the glass industry has increased.

Based on those loans, new state-of-the-art bottle-production facilities have been organized at such factories as the Moscow Electric Bulb Works, Anopinskii Factory and Krasnoe Ekho Works (Vladimir Region), Salavatskii (Baskortostan), and Ekran (Novosibirsk Region). The total annual production volume of installed capacities amounted to around 450 million bottles per year (converted to 0.5-liter bottle). In addition to the above listed, the factories with sophisticated technologies include the company “9 Yanvarya” (Tver region), in which the production was organized in the 1980s based on machinery produced by Haje Glass (Germany), and Industriya (Tver Region). At the same time, as a consequence of physical wear of equipment and bankruptcies, production capacities of the total annual output of 250 million bottles had to be removed from operation.

The investments in the forms of loans were guaranteed by the Russian Government and the regional administrations. The guarantees were given due to the high efficiency of production of glass containers. Thus, loans for setting up bottle-making facilities for 100 – 200 million bottles per year (converted to 0.5-liter) were repaid within 2 – 2.5 years, and by some companies in less than 1.5 years.

Other factories were equipped with physically worn and obsolete machinery: 70% of the machines had been in operation for more than 25 years. Glass-melting furnaces and dosing-and-mixing lines were obsolete and had unsatisfactory physical parameters, especially the values of glass melt output (600 – 800 kg per 1 m<sup>2</sup> of the melting zone of the fur-

nace) and fuel consumption (up to 3500 kg per 1 kg of melted glass). This results in low quality and high cost of the product.

All this encourages the reconstruction of existing lines and installation of new lines for container glass production based on state-of-the-art imported machinery, domestic dosing-and-mixing lines, and domestic glass-melting furnaces, whose specification parameters mostly satisfy the western standards, while being less costly.

The dosing-mixing lines (DML) in the majority of glass-container factories used to be based on a platform scale and a mixer resembling a concrete mixer. Deviations from the maximum weighing limit amounted to 0.5 – 1.0%, which is significantly higher than the parameter prescribed in the Operating Rules.

In the 1980s and 1990s, the State Institute of Glass and the Stromizmeritel’ Company developed strain-measuring scales and microprocessor blocks for dosing control. These devices made it possible to develop a new technology of dosing. The new technology is based on discrete-continuous dosing principle. It is known that continuous weighing provides for high efficiency, and discrete dynamic proportioning ensures high accuracy of weighing.

The dosing precision has been increased to 0.1 – 0.2% of the maximum weighing limit, and the output of the DML has been raised up to 800 tons of batch per day. This provides for high quality of the batch (and, accordingly, of glass), reduces fuel consumption, and in view of the simplification of the mechanical units of the weighing line and refined reliability of the electronic systems, there is no need to keep a spare DML.

According to a technical task prepared by the Institute of Glass, the VNIPKISTeklomash Institute developed new types of mixers that ensure high quality of mixing. On the whole, the domestic DML corresponds to the technical level achieved in the industrial western states and has a significantly lower cost.

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At the end of the 1990s and the beginning of the new century the Institute of Glass with participation of Giprosteklo and glass factories Aktis and SAF developed highly efficient furnaces with horseshoe-shaped flame. The unit output of these furnaces reaches 2000 kg per 1 m<sup>2</sup> of the melting zone and the specific fuel consumption is up to 1250 – 1350 kcal/kg of melted glass. A furnace of capacity 290 tons/day developed by the Zorg company (Germany) with participation of the Institute of Glass is currently due for installation. These furnaces as well comply with the technical specifications of the world level.

After the default in 1998, the import of beer and alcoholic drinks to Russia dropped 3 – 5 times. The Government of the RF in 1999 issued decree No. 943 “On ordering import and sales of alcoholic beverages produced abroad on the customs territory of the RF” and the decree of the President of the RF “On the state monopoly of ethyl alcohol production.” As a consequence, in the second quarter of 1999 of Russian alcohol and vodka-and-liqueur factories were at 75 – 80% capacity (in contrast to the second quarter of 1996, when they were at 35 – 45% capacity).

The volume of glass bottle production in Russia (converted to 0.5-liter) in 1998 amounted to around 1800 million pieces per year. The installed capacities of bottle-making factories in Russia in the same year amounted to 2400 million pieces per year. According to the official data of the Russian customs, the import of bottles in the same year was 650 million pieces per year. The real volume of import was at least twice as much. The manufacturers of alcoholic and non-alcoholic drinks in 1998 needed around 3800 million bottles per year.

After 1998 – 1999 the production cost of glass containers in Russia calculated in dollars became significantly lower than in other countries, which made it possible to ensure stable profits for glass factories. Some manufacturers of high-quality glass containers were able to export their products. The volume of exported glass container to the CIS countries (Armenia, Georgia, Azerbaijan)s was especially high.

In subsequent years the investments of western (Czech Republic, Germany, Turkey, Belgium) and domestic (Aktis, RASKO, Stekloholding, Alpha Group, etc.) companies were resumed and resulted in setting up production capacities for about 1.2 billion bottles and jars. However, the introduction of new capacities will be unable to satisfy the current demand in bottles and especially the projected increase in the production of drinks in Russia.

Supplies of inferior-quality bottles from Ukraine, Belorussia, Bulgaria, and Poland will decrease due to their unbalanced cost and quality. Supplies of exclusive, souvenir, and traditional bottles from the Czech Republic, Germany, Italy, and France will not decrease in the nearest future, since they cannot be replaced as yet.

According to the official data, the volume of imported glass containers had increased up to 1.2 billion pieces by 2001, and according to our estimates, it was up to 2 – 2.5 bil-

lion bottles and up to 2 – 2.5 billion jars, taking into account imported fruit and vegetable preserves.

The price of a beer bottle supplied from the Western countries is 12 – 18 U.S. cents. This is a very high price, but even if it is to grow, it will proceed very slowly. A significant shortage of bottles is observed in the eastern regions of Russia. Transportation of bottles from Europe to the east of Russia involves significant additional expenses. The beer manufacturers are interested in replacing imported bottles by domestic ones at acceptable prices. At the same time, in the production of premium mineral water, non-alcoholic, and especially alcoholic beverages, the price of high-quality bottle has less significance, especially considering that the price of such drinks tends to increase. Their manufacturers as well are interested in domestic suppliers to decrease the production cost and to promptly receive bottles of required sizes and designs (exclusive of packaging). The quality of a glass container, especially its exterior appearance, is of special importance, since not all glass factories are able to provide this.

Several western companies organized in Russia their own facilities for production of grape wines, coffee, mayonnaise, honey, and vegetable preserves. As a rule, these companies use glass containers and impose rigid requirements on them.

It should be noted as well that domestic manufacturers usually produce a limited range of glass containers. Thus, production of small-volume, exclusive, and souvenir bottles, which enjoy great demand, is insufficient. Some producers of drinks (“Smirnov,” “Borzhomi,” “Kristall,” etc.) prefer using only exclusive bottles for their product, whereas others use a wide range of bottles (of different sizes and shapes) for each brand of product to make it recognizable. At the moment the greater part of this demand is satisfied by import.

Another problem of the domestic industry is the obsolete equipment at most glass-container factories, which prevents making bottles that meet the contemporary requirements regarding their shape and exterior appearance, or lightweight bottles, or making fast transitions from one type of bottle to another.

Russia currently produces about 16,000 million liters of drinks. The total annual production of glass containers is 3700 million pieces converted to 0.5-liter, including about 3000 million bottles (83%) and 700 million jars (17%).

By the end of 2002, the Aktis company plans to put into operation the second production division of capacity 250 million bottles, and two glass-container factories will be put into operation in Kingisepp and Kirishi (Leningrad Region) of total capacity 300 million bottles.

No expansion of glass jar production is expected. Neither are there projections for increasing the production of glass containers in the eastern regions of Russia.

According to an expert evaluation, the annual demand for glass containers amounts to 9 – 9.5 billion bottles and 4.4 billion jars (converted to 0.5-liter), which correlates with the production capacities for fruit and vegetable preserves in 2001 (4.4 billion jars).

The volume of production of beverages in the RF significantly exceeds the volume of bottle production. This imbalance is compensated by reusable, polyethylene, large-size (barrels), small metal tins, and imported packaging (Table 1).

The demand for glass jars is not satisfied either. The production volume in 2001 is estimated at 700 million pieces, and imported jars, according to the State Statistical committee, amount to 200 thousand pieces. The import of vegetable and fruit preserves in glass jars is at least 2000 million conventional jars (without taking into account honey, coffee, fish preserves, ketchup, etc.)

The annual growth rate in the production of beverages is 15–20% and the growth rate of glass containers is 10–12%. Consequently, one can expect further investments in production of glass containers, taking into account their fast return.

Thus, the production of drinks in Russian is estimated at 1600 million liters and the production of bottles at 3 billion pieces converted to 0.5-liter. This imbalance between the production of drinks and glass containers for their packaging is compensated by polyethylene, reusable glass, and metal containers and also by imported packaging.

The use of PE and metal containers with PE coating deteriorates the quality of drinks and leads to the formation of chemical agents dangerous to human health. Reusable glass bottles deteriorate the quality of drinks due to possible presence of residual detergents and formation of defects in containers.

The consumption of fruit and vegetable preserves in the RF (production capacities) amounts to 4.4 billion conventional jars. The production volume of glass jars is 700 million pieces. The imbalance is compensated by reusable containers and by import. The production volume of fruit, vege-

TABLE 1

Type of container	Share in total sales volume, %	Disadvantages
Glass disposable	25	—
Glass reusable	35	Residual mineral acids from detergents dangerous for health
Polyethylene	15	Permeable for CO <sub>2</sub> and O <sub>2</sub> , dissolves acetaldehyde in drinks
Glass imported	20	High cost of bottles
Metal large-size (barrels)	4	Dissolves acetaldehyde from plastic coating
Metal small-size (tins)	1	Lower resistance to undesirable variations in taste, shorter shelf life

table, fish, and other preserves could be increased many times, if more glass containers were available.

The glass container production is unevenly distributed in the RF territory. In particular, the production of glass bottles and jars in the Eastern, Southern, Volga, and Ural regions is insignificant.

As can be seen from the production experience of glass-container factories recently constructed and the feasibility analysis carried out by the State Institute of Glass, the period of repayment of a glass-container factory amounts to 2–2.5 years. The economic efficiency can be increased by partly using available infrastructure and some available machinery of closed or reconstructed factories.

Due to dynamic changes in market conditions in Russia, monitoring of the container glass market should be performed periodically.